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TRACHYTES KALISZEWSKII, N. SP. (ACARI: UROPODINA), FROM THE GREAT BASIN (UTAH, USA), WITH REMARKS ON THE HABITATS AND DISTRIBUTION OF THE MEMBERS OF THE GENUS *TRACHYTES*

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Abstract.—*Trachytes kaliszewskii*, n. sp., is described from the Great Basin, Utah, USA. SEM photography illustrates morphological detail. An annotated list is included of currently recognized species of the genus *Trachytes*, with comments on their distribution and habitat characteristics.

Key words: mites, Trachytes kaliszewskii, *Uropodina, Great Basin, Utah.*

Mites of the genus *Trachytes* Michael, 1894, are a morphologically distinct entity of the Uropodina. The genus consists of 31 species known mainly from the Palearctic region of Europe and Japan. Wiśniewski and Hirschmann (1993) mention two species from the USA: *T. aegrota* (C. L. Koch, 1841) and *T. traegardhi* (Hirschmann and Zirngiebl-Nicol, 1969). *Trachytes traegardhi* is regarded as *nominum nudum*. The USA listing for *T. aegrota* is considered either a mistake in determination or an accidental introduction.

Taxonomic studies on mites of the genus *Trachytes* are found in Hirshmann and Zirngiebl-Nicol (1969), Huţu (1983), and Pečina (1970). Information on their biology, ecology, and zoogeography is found in Athias-Binche (1978, 1979, 1980, 1981, 1985), Pečina (1980), Błoszyk (1980, 1982, 1984, 1985, 1990, 1991, 1992, 1993), Błoszyk and Athias-Binche (1985), Błoszyk and Miko (1990), Błoszyk and Olszanowski (1985a, 1985b, 1985c, 1986), and Błoszyk et al. (1984).

We found a new species of the genus *Trachytes* in soil collected from Rock Canyon near Provo, Utah, USA. It is most similar to those described by Hiramatsu (1979, 1980) from Japan: *T. aoki* and *T. onishii*. Morphological differences between our species, those mentioned from Japan, and *Trachytes aegrota* are shown in Table 1. Our new species is dedicated to the Polish acarologist, Dr. Marek Kaliszewski, who was a faculty member at Brigham Young University, Provo, Utah, USA, until 1993, when he died tragically in an automobile accident.

Systematic Status of the Genus *Trachytes* Michael

Superfamily.—Polyaspidoidea sensu Athias-Binche & Evans, 1981

Family.—Trachytidae Trägårdh, 1938

Genus.—*Trachytes* Michael, 1894

Type species.—*Celano aegrota* C. L. Koch, 1841 (=*Trachynotus pyriformis* Kramer, 1876)

Mites of middle size, strongly sclerotized, dorsoventrally flattened. Idiosoma triangular, "vertex" distinct with smooth or slightly serrated edges. Corniculus simple, laciniae longer than corniculi. Hypostomatic setae: ***h1*** very long, simple; ***h2*** shorter than ***h1***, simple; ***h3*** very long, massive; ***h4*** very short, serrated. Fixed digit of the chelicera longer than moveable digit, sharply pointed distally. Base of tritosternum wide, not covered by coxae I.

Trachytes kaliszewskii, n. sp.

Diagnosis.—The form of the body is typical for the genus *Trachytes* Michael. Vertex with lamella. Dorsal shield with polygonal pattern and irregular cavities in central part (similar to *T. aegrota*). Marginal shield is not divided as in European species, without polygonal pattern. Dorsal setae long and massive. Small pygidial shield present in female. Epigynial shield trapezoidal with net pattern, front margin slightly convex and produced laterally into little corns. Sternal setae short. Operculum of male rounded, with a pair of long genital setae. Ventroanal shield separated from sternal and metapodal shields by a wide zone of interscutal membrane.

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Ventral setae long. One pair of paranal setae. Postanal seta present.

ADULT FEMALE.—Length of idiosoma 900–907 μm, width 535–574 μm.

Dorsum: Lamellae with characteristic pattern. Marginal shield not divided posteriorly, with irregular cavities in posterior part. Dorsal shield with polygonal pattern laterally and irregular cavities in central and posterior parts (Figs. 1, 10, 11). Dorsal setae long and massive. Two pairs of setae on vertex; no unpaired medial dorsal setae. Marginal setae on small scutellae; 4 pairs of setae situated medially on marginal shields. Pygidial shield with pattern as on marginal shield.

Ventrum: Sternal shield (Fig. 2) fused to parapodals. Ventroanal shield separated from sternal and metapodal shields by a zone of interscutal membrane bearing 4 pairs of platelets (Fig. 13).

Sternal shield smooth, bearing 5 pairs of short sternal setae. Setae: ***st*1** situated between coxae II at the level of their front margins; ***st*2** and ***st*3** placed above anterior edge of epigynium; ***st*4** and ***st*5** situated laterally of epigynium. Opisthogastric setae generally long, simple or delicately serrated, most anterior pair short, similar to sternal setae. First pair of opisthogastric setae situated below posterior margin of epigynium, 2nd pair on metapodal shields, with 4 pairs on interscutal membrane and 2 pairs on ventroanal shield. One pair of adanal setae; short and serrated. Postanal seta long. Exopodal and metapodal shields with oval or irregular cavities. Ventroanal shield smooth anteriorly, with polygonal patterns in the posterior regions.

Epigynial shield trapezoidal, with front margin slightly convex and produced laterally into little corns; measurements: 175–199 μm length and 137–156 μm width ($N = 3$). Surface of epigynium with delicate polygonal net in anterior and central areas.

Peritrema simple, without poststigmatic section, extending from the level of the posterior border of the foramen pedale III (with stigma) to beyond coxae II.

Gnathosoma: Laciniae (internal mala) longer than corniculi, serrated. Hypostomatic setae (Fig. 4) smooth except for setae ***h*4** which are delicately serrated; ***h*1** very long, ***h*2** shorter than ***h*1**, ***h*3** long as ***h*1** but more massive, ***h*4** shorter than ***h*2**. Three transversal rows of hypognathal denticles between setae ***h*3** and ***h*4**.

Appendages: Shape of chelicerae typical for *Trachytes;* fixed digit of the chelicera longer than moveable digit, shaped distally. Pedipalp ventral, setae of trochanter (**v1, v2**) massive and serrated (Fig. 5).

Shape of legs typical for family. Tarsi of legs II–IV with 4 long setae (3 times longer than

TABLE 1. Summary of major differences between closely related *Trachytes* species.

Character	*T. aegrota*	*T. aoki*	*T. onishii*	*T. kaliszewskii*
Sex	parthenogenic	bisexual	?	bisexual
FEMALE				
Lamella	transverse	transverse	transverse	oblong
Setae on interscutal membrane	absent	present	absent	present
Unpaired mediodorsal seta	present	absent	absent	absent
Body measurements (in μm)	600 × 685	400 × 450	400 × 600	535–574 × 900–907
Hypostomal setae h3	simple	massive	massive	massive
Setae on ventroanal shield	different	equal	equal	equal
Epigynium	smooth	smooth	with polygonal net	
Ventral seta on metapodal shields	long	short	short	long
Seta *Pa*	short	short	short	long

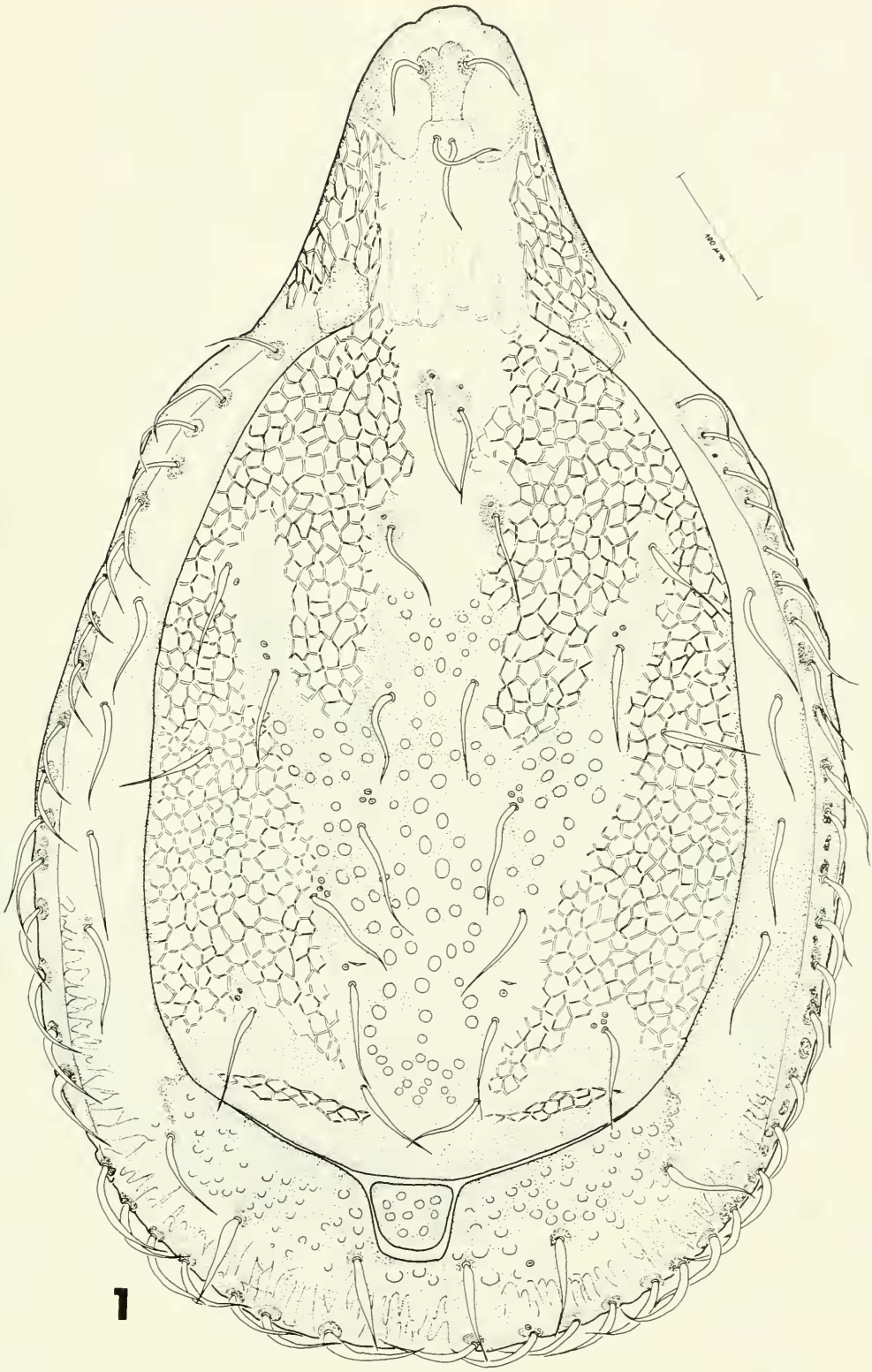


Fig. 1. *Trachytes kaliszewskii*, n. sp., dorsal view of female idiosoma.

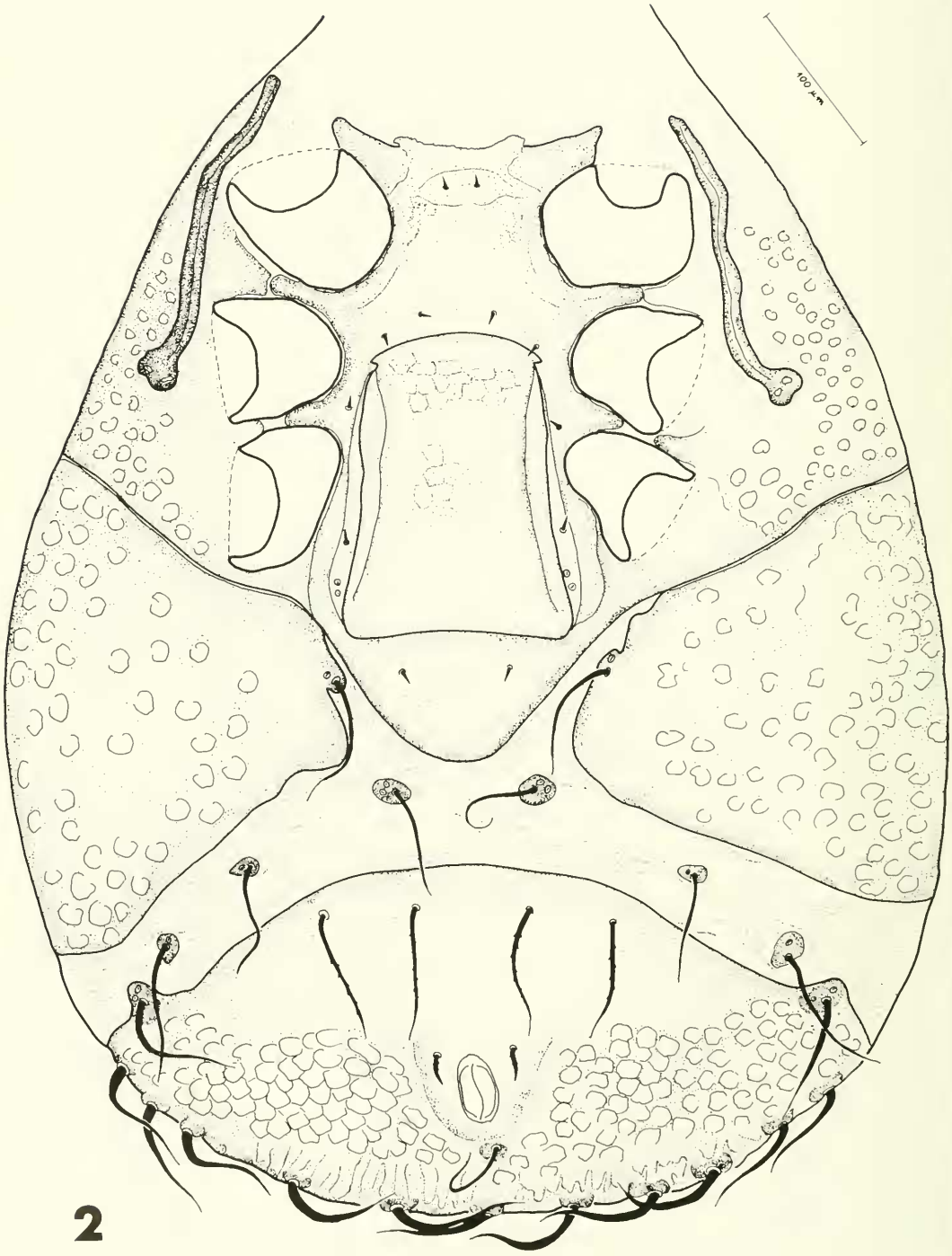


Fig. 2. *Trachytes kaliszewskii*, n. sp., ventral view of female idiosoma.

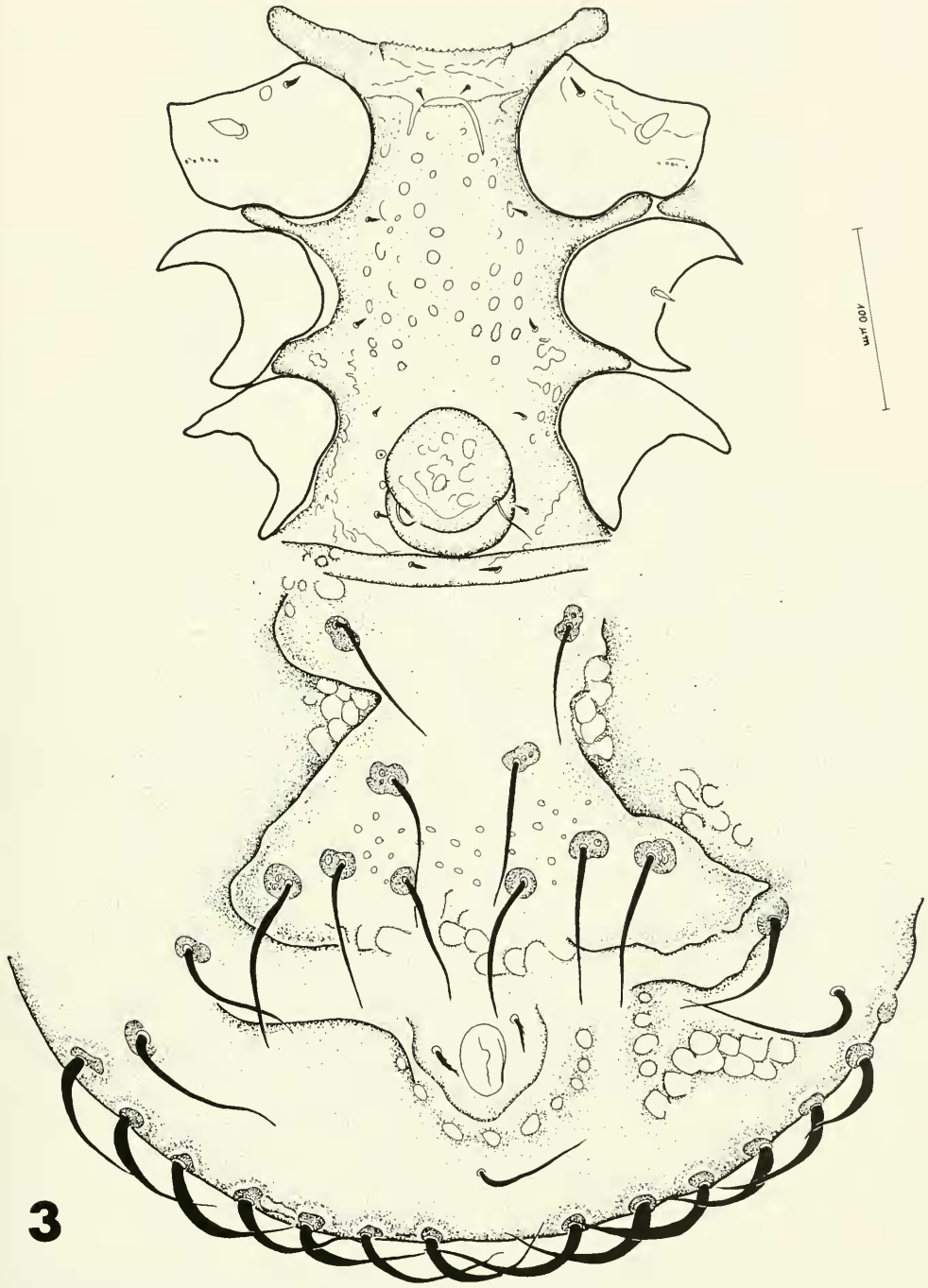
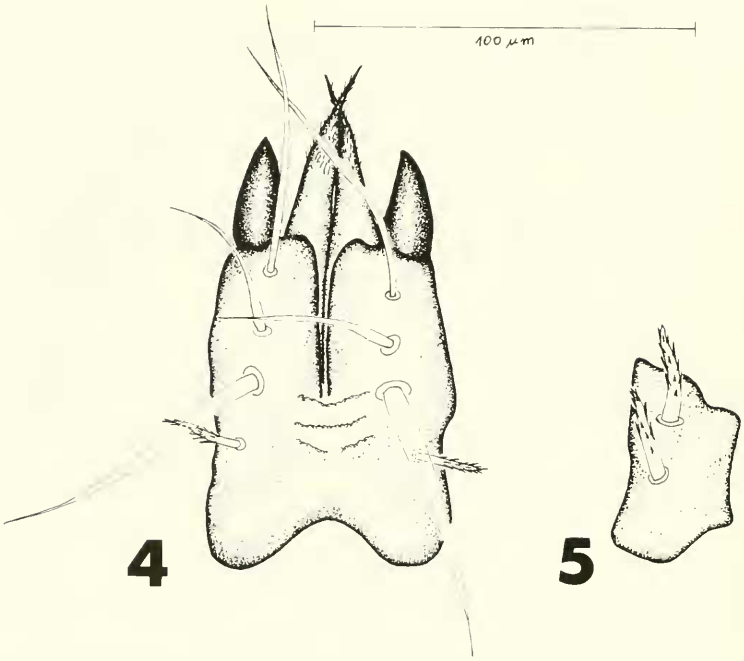


Fig. 3. *Trachytes kaliszewskii*, n. sp., ventral view of male idiosoma.



Figs. 4–5. *Trachytes kaliszewskii*, n. sp., female: 4, gnathosoma, ventral view; 5, ventral setae of palpal trochanter.

others), small claws, and a very long distal seta. Shape of dorsal setae on tarsus, tibia, genu, and femur of legs I as in the genera *Polyaspis* and *Polyaspinus*. Chaetotaxy of legs I and IV is shown in detail in Figures 6 and 7.

Sexual dimorphism observed on femora II (Figs. 8, 9).

ADULT MALE.—Body measurements 830–862 μm × 538–540 μm.

Dorsum: Male dorsum slightly changed in posterior part; pygidial shield absent (Fig. 12). Sculpture and dorsal chaetotaxy as in the female.

Ventrum: Sternal shield with numerous oval cavities and bearing 3 pairs of short sternal setae (Fig. 3). Genital operculum rounded (74–79 × 72 μm), located a little below coxae IV, with 1 pair of long genital setae. Opisthosoma separated by transverse suture with interscutal membrane. Seven pairs of long ventral setae on rounded platelets; 1st pair short, located below operculum. With 1 pair of delicately serrated adanal setae and long unpaired postanal seta (**Pa**). Opisthosoma with polygonal sculpture on metapodal and anal shields and small oval cavities on central portion.

DEUTONYMPH.—Body measurements 624 × 396 μm.

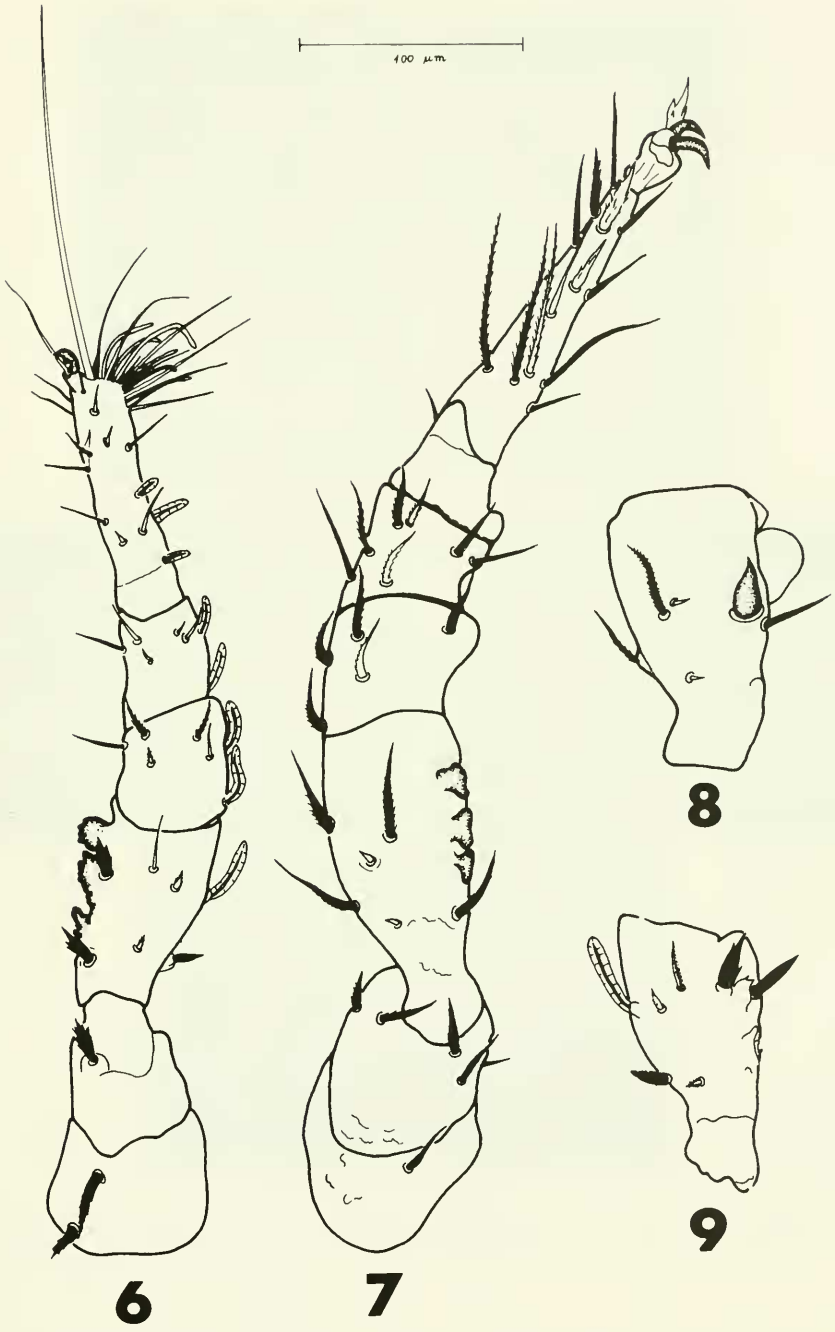
Dorsum: Dorsum with polygonal pattern (Fig. 15). Podonotal shield trapezoidal, fused with lamellae. Mesonotal shields large, triangular, with 4 setae. Pygidial shield arched, with 2 pairs of setae. Dorsal setae strong, massive. Setae on interscutal membrane and marginal setae inserted on small platelets.

Ventrum: Ventrum with polygonal pattern (Fig. 16). Sternal shield elongated, with 5 pairs of short sternal setae; most posterior pair delicately serrated. Opisthogastric setae situated on interscutal membrane, delicately serrated, sitting on small platelets. Large ventroanal shield with 2 pairs of short adanal setae (**Ad**), postanal seta (**Pa**) longer than **Ad**; both setae serrated.

PROTONYMPH.—Body measurement 528 × 295 μm.

Dorsum: Dorsum with polygonal pattern (Fig. 17). Podonotal shield trapezoidal. Mesonotal shields large, oval-triangular, without setae. Pygidial shield arched, with 2 strong, massive setae. Dorsal setae strong, massive. No setae on intersutal membrane. Marginal setae numerous, inserted on small platelets.

Ventrum: Sternal shield smooth, elongate, with 4 pairs of simple sternal setae (Fig. 18). Four massive, serrated opisthogastric setae

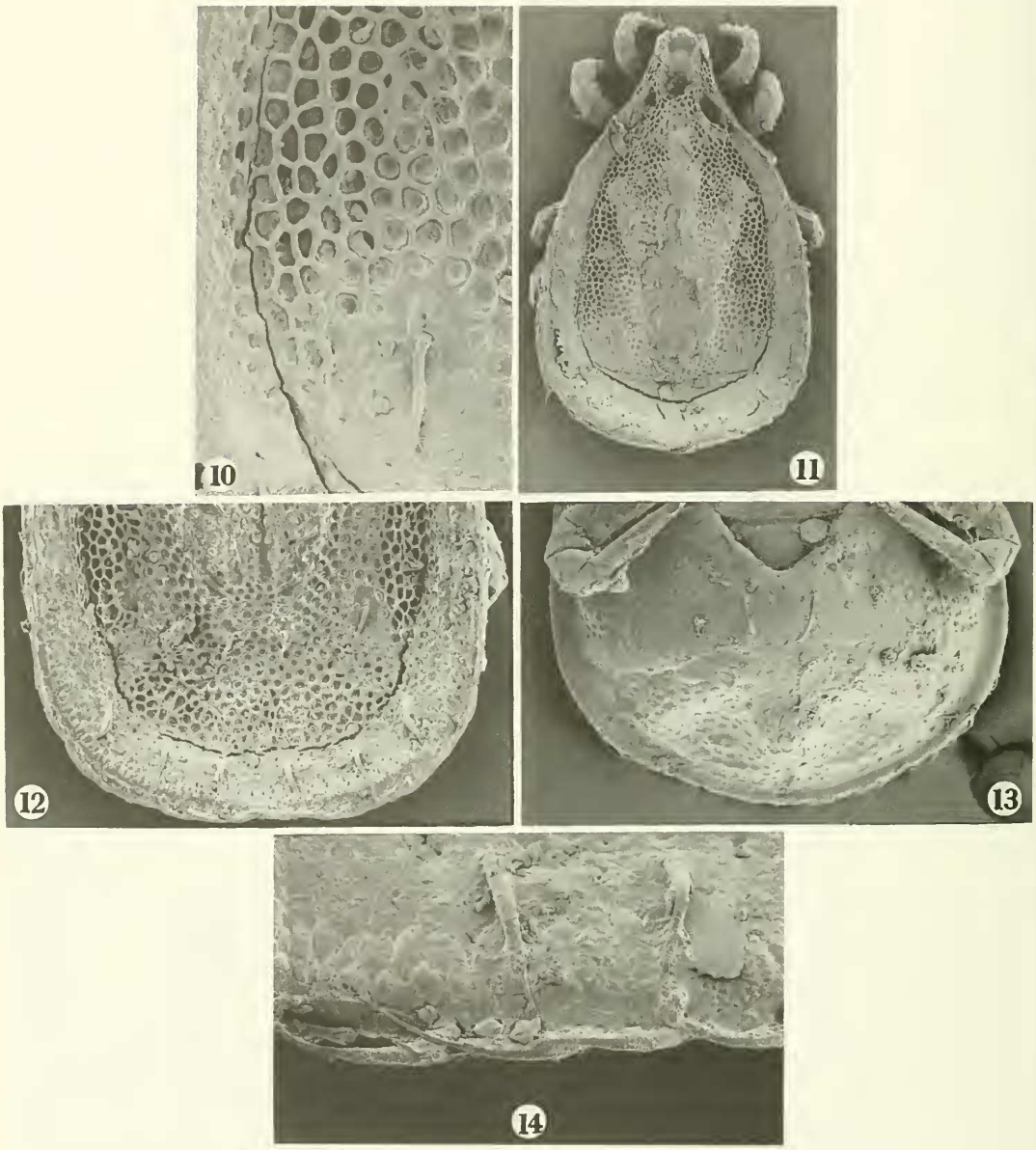


Figs. 6–9. *Trachytes kaliszewskii*, n. sp., legs chaetotaxy: 6, leg I of female; 7, leg IV of female; 8, chaetotaxy of male femora II; 9, chaetotaxy of female femora II.

situated on intersutal membrane. Large ventroanal shield with 1 pair simple adanal setae and a long postanal seta.

MATERIAL EXAMINED.—All specimens were collected from soil under a maple tree in Rock Canyon near Provo, Utah, 10 September 1992; leg. J. Błoszyk (holotype and 5 paratype females, 7 paratype males, 7 deutonymphs, 5 protonymphs).

The holotype is deposited in the Canadian National Collection, Biosystematics Research Centre, Ottawa, Canada. Paratypes are deposited



Figs. 10–14. *Trachytes kaliszewskii*, n. sp.: 10, dorsal polygonal pattern of female (550X); 11, female, general dorsal view (110X); 12, posterior part of male idiosoma (220X); 13, opisthosoma of female (200X); 14, marginal setae of female (750X).

in the Monte L. Bean Life Science Museum, Brigham Young University, Provo, Utah, USA; in CSIRO, Canberra, Australia; and in J. Błoszyk's collection (Acarological Association, ul. Lisowskiego, 16/1, 61-606 Poznań, Poland).

LIST OF THE *TRACHYTES* SPECIES WITH REMARKS ON DISTRIBUTION AND HABITAT PREFERENCES

Hirshmann (1993) listed 31 species referable to the genus *Trachytes*. In view of the

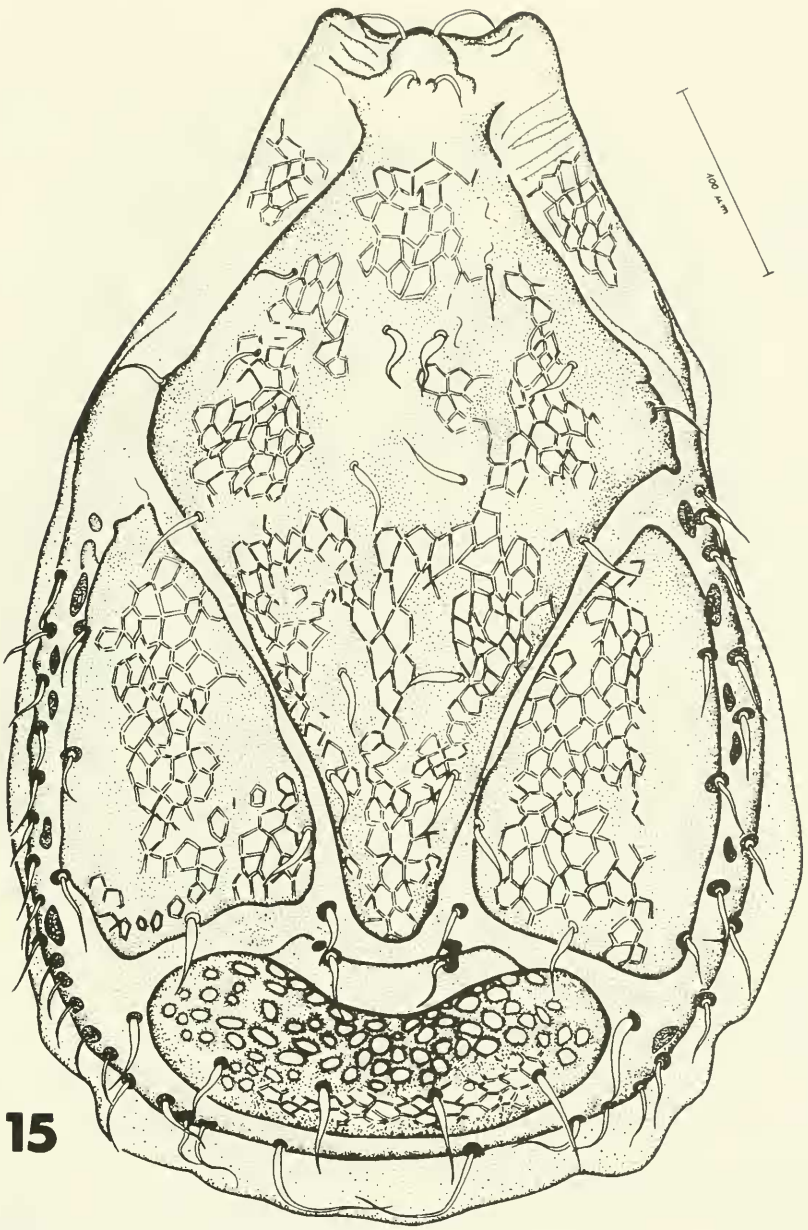


Fig. 15. *Trachytes kaliszewskii*, n. sp., dorsal view of deutonymph idiosoma.

above, we recognize 31 species in the genus *Trachytes* as follows[2]:

Trachytes aegrota (C. L. Koch, 1841) is one of the most numerous Uropodine species in central Europe. This species is parthenogenetic and nonphoretic; males are rarely found (sex ratio is 1:10,000). This eurytopic species lives in all kinds of biotypes, but it prefers forest litter. It most often occurs below 500 m elevation but is considered a tychoalpine species (i.e., lives in the mountains as well as the lowlands). In Poland the spring–summer season is the best time to observe the larva.

[2]Some data from Poland originate from an unpublished investigation carried out by J. Błoszyk in the thematic program *Bank of Invertebrate Fauna*; data on the distribution may be found in Hirschmann (1979, 1993), Huţu (1973, 1983), Hiramatsu (1979, 1980), and Athias-Binche (1981).

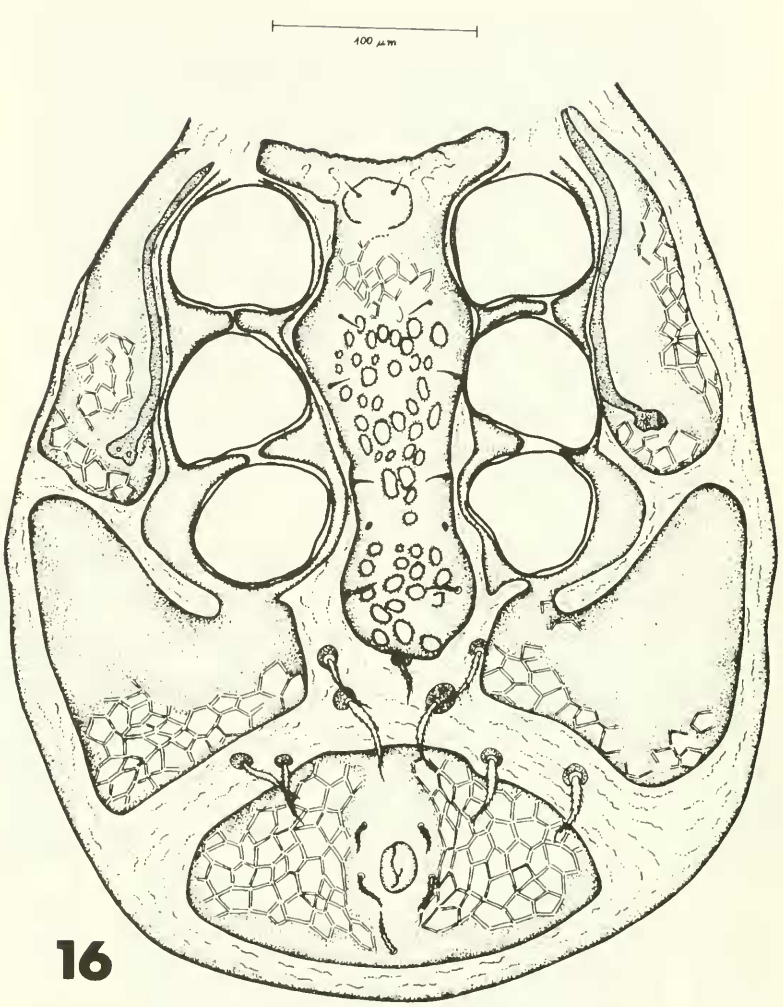


Fig. 16. *Trachytes kaliszewskii*, n. sp., ventral view of deutonymph idiosoma.

Trachytes aoki Hiramatsu, 1979. Japan. In litter.

Trachytes arcuatus Hirschmann and Zirngiebl-Nicol, 1969. Austria, Romania, Hungary. Habitat unknown.

Trachytes baloghi Hirschmann and Zirngiebl-Nicol, 1969. Romania, Hungary. Habitat unknown.

Trachytes decui Huţu, 1983. Romania. In litter.

Trachytes edleri Huţu, 1983. Sweden. In grass.

Trachytes elegans Hirshmann and Zirngiebl-Nicol, 1969. Spain, Austria. Edaphic species.

Trachytes eustructura Hirshmann and Zirngiebl-Nicol, 1969. Spain and Austria. Associated with *Fabaceae*.

Trachytes hiramatsui Huţu, 1983. Romania. Habitat unknown.

Trachytes hirschmanni Huţu, 1973. Romania. In moss.

Trachytes hokkaidoensis Hiramatsu, 1983. Japan. Soil.

Trachytes inermis (Trägårdh, 1910). Sweden. In litter, moss, lichens, and under bark.

Trachytes irenae Pečina, 1970. A submontane species, reported from Czech Republic, Slovakia, Romania, Austria, Poland, and Yugoslavia. This species shows a considerable preference for beech and beech-fir forest litter. Poland is the northern limit of its distribution.

Trachytes lanuda Berlese, 1904. Rare European species. Parthenogenetic and nonphoretic species—males found very rarely (sex ratio

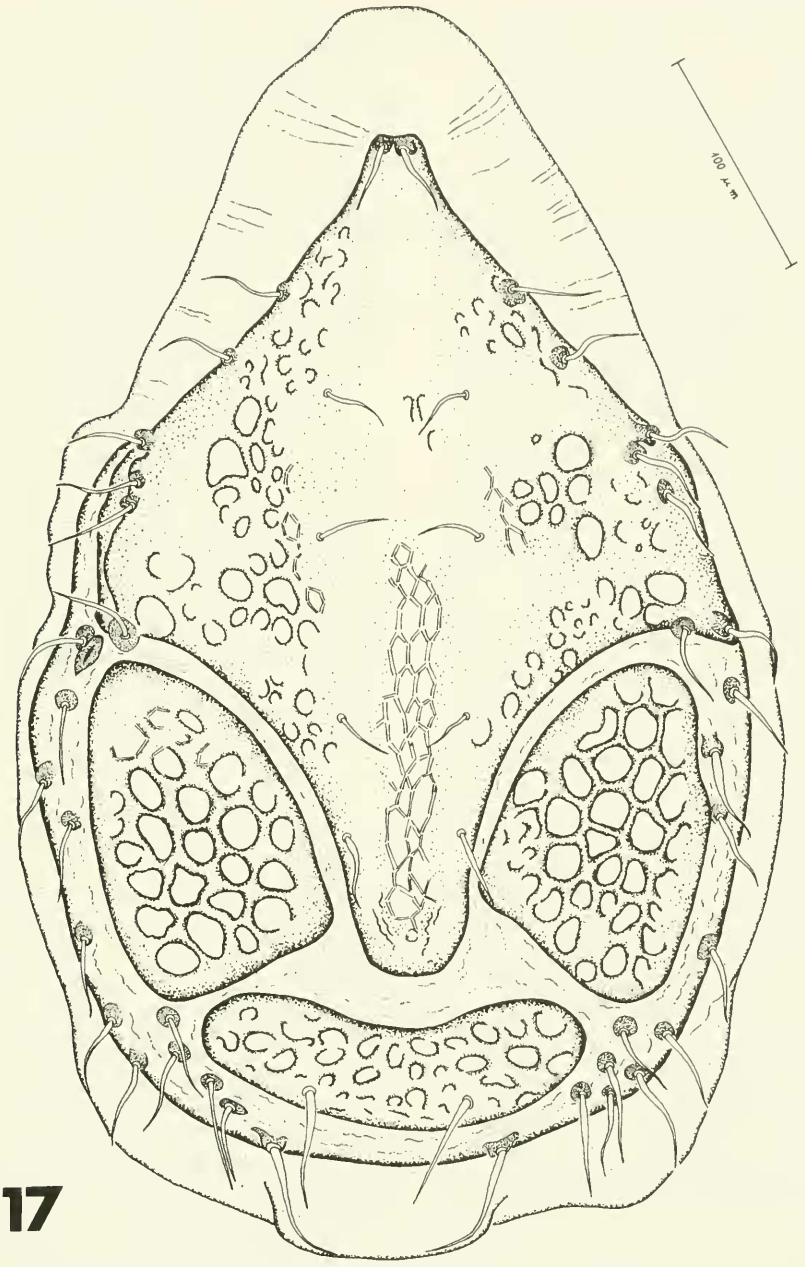


Fig. 17. *Trachytes kaliszewskii,* n. sp., dorsal view of protonymph idiosoma.

1:400). Forest litter species typical of the beech forest and *Quercus-Carpinetum* forest. Not usually found above 500 m elevation.

Trachytes micropunctata Huţu, 1973. Romania. In litter

Trachytes minima Trägårdh, 1910 sensu Pečina 1970. Czech Republic, Slovakia, Poland, and Ukraine. Reports of this species in Sweden and Great Britain most likely refer to *Trachytes pauperior.* Poland is the northern limit of its distribution. *T. minima* prefers multispecies litter: deciduous forests, beech and beech-fir forests, brush, rock, and on grasses of calcareous ground. It is most commonly found

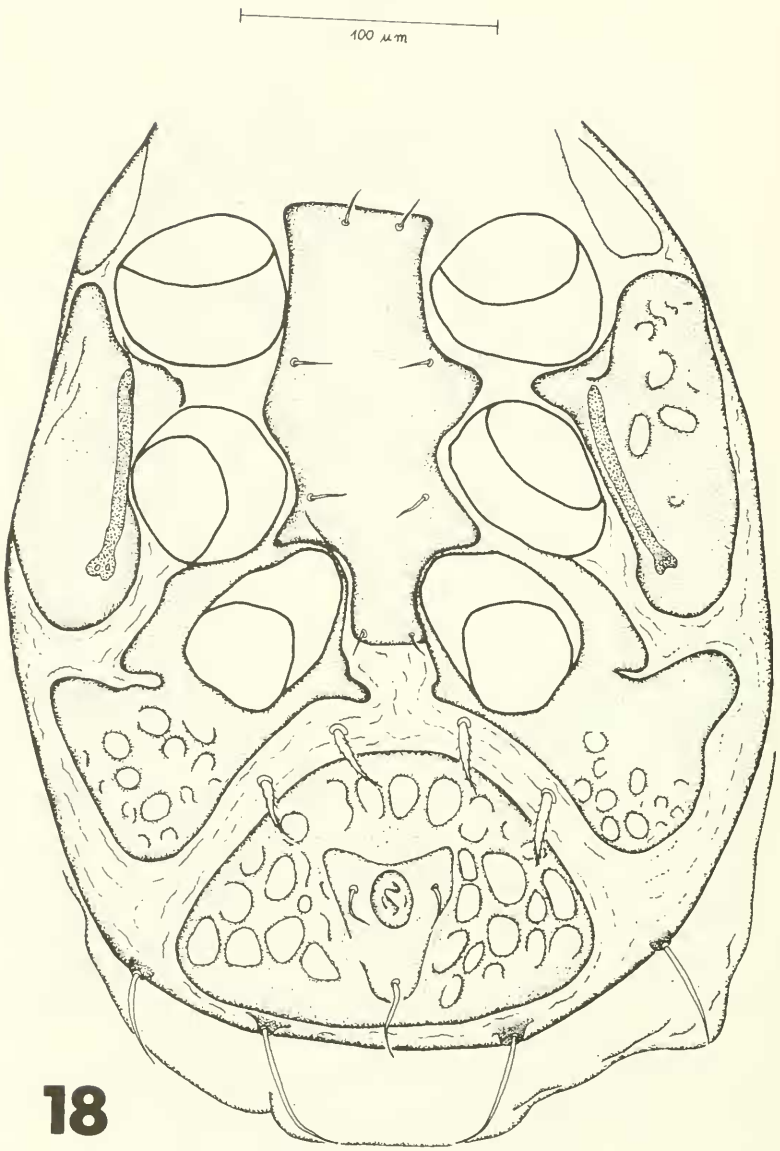


Fig. 18. *Trachytes kaliszewskii*, n. sp., ventral view of protonymph idiosoma.

between 300 and 900 m elevation. It is not found in the Tatra or Babia Góra Mountains.

Trachytes montana Willmann, 1953. High mountains in Austria, Czech Republic, Poland. This is a typical mountain species that prefers cold rocks and grasses on noncalcareous ground, spruce forest, dwarf-pine, beech, and fir-beech forest. Its optimum occurrence is at elevations above 1000 m.

Trachytes mystacinus Berlese, 1910. Italy, Switzerland, and Austria. Habitat unknown.

Trachytes onishii Hiramatsu, 1980. Japan. In litter.

Trachytes oudemansi Hirschmann and Zirngiebl-Nicol, 1969. Germany, Romania. In litter.

Trachytes pauperior (Berlese, 1914). Widely distributed European species but not as abundant as *T. aegrota*. *T. pauperior* is a parthenogenetic and nonphoretic species; males are rare as in the case of *T. aegrota* (sex ratio is 1:400). It appears in varied biotypes but most often in beech forest, multispecies deciduous

forests, on grass, and on decalcified rocks. A tychoalpine species. The best time to observe the larva is during the spring–summer season.

Trachytes pecinaia Huţu, 1983. Romania. In litter.

Trachytes pi Berlese, 1910. West and Central Europe. In litter.

Trachytes romanica Huţu, 1983. Romania. In litter.

Trachytes splendida Huţu, 1983. East Carpathian species—Romania, Poland, Slovakia. In litter and moss.

Trachytes stammeri Hirschmann and Zirngiebl-Nicol, 1969. Locality and biotype unknown.

Trachytes tesquorum Pečina, 1980. Czech Republic. In grass.

Trachytes traeghardi Hirschmann and Zirngiebl-Nicol, 1969. Locality and biotype unknown.

Trachytes tubifer Berlese, 1914. Italy, Austria. In litter.

Trachytes welbournia Moraza, 1989. Spain. In litter.

Trachytes wisniewski Huţu, 1983. Romania. In litter.

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